



Environment
Canada

Environnement
Canada

Conservation
and
Protection

Conservation
et
Protection



Western and Northern
Region

Région de l'Ouest et
du Nord



Environmental
Protection

Protection
de l'environnement

Canada

A REPORT ON ROAD DUST
SUPPRESSION IN MANITOBA

By: I.D. Systems Ltd.

Report CP(EP)WNR 90-91-1
December 1989

91-00634/

A REPORT ON ROAD DUST
SUPPRESSION IN MANITOBA

Prepared for:

Environmental Protection
Conservation and Protection
Environment Canada
Winnipeg, Manitoba

December 1989

REVIEW NOTICE

This report has been reviewed by Environmental Protection, Conservation and Protection, Western and Northern Region, and approved for publication in its regional report series. Approval does not necessarily signify that the contents reflect the views and policies of Environment Canada.

READERS COMMENTS

Readers who wish to comment on the content of this report should address their comments to:

Mr. Adolf Andres
Environment Canada
Conservation and Protection
Environmental Protection
5th Floor, 269 Main Street
Winnipeg, Manitoba
R3C 1B2

TABLE OF CONTENTS

		<u>Page No.</u>
1.0	INTRODUCTION	1
2.0	METHODOLOGY	3
3.0	RESULTS AND DISCUSSION	4
4.0	CONCLUSION	8

APPENDICES

Appendix 1 - Sample Questionnaire

Appendix 2 - Summary of type of Dust Abatement
Treatments Used by All Agencies

1.0 INTRODUCTION

Generation of road dust has both environmental and social implications. Safety, aesthetics, health, vegetation, soils and aquatic resources are areas that could be impacted by road dust. Dust suppression on minor gravel roads is, therefore, routinely carried out by municipalities, towns, villages and local government districts in Manitoba during summer months.

Throughout Manitoba, there are a number of products used on gravel roads to suppress dust. The products are:

Calcium Chloride This is a commonly used salt which is applied in a water solution. Like most products, it is usually spread from a spray boom attached to the back of a tanker truck.

Calcium Lignosulphonate This product, also called "Envirobind" or "M & F Road Stabilizer", is a concentrated natural bi-product of wood pulp made by extracting the bonding agents incorporated in a large variety of trees. It is apparently non-corrosive, non-toxic and does not appear to contaminate the environment. The formula for this product varies between manufacturers but remains basically the same.

Used Oil This is generally crankcase oil taken from vehicles such as cars and trucks. It contains quantities of gasoline, antifreeze, hydraulic fluid, solvent, lubricating oils, gear oil and sometimes diesel fuel. It is usually collected from service stations and garages.

Crude Oil This is unrefined crude oil and sludge found in the bottom of crude oil storage and transport tanks. It has a waxy consistency and its use is generally confined to the Virden area.

Asphalt Oil This is generally a fine or medium base oil used in asphalt production. It is composed mostly of water, asphalt, caustic soda, an emulsifier and fuel oil.

Except for calcium lignosulphonate, all of these dust suppressants can have an adverse environmental impact. The impact of the suppressants are a function of frequency and volume of applications, weather conditions, and the type of adjacent ecosystems. In addition, some oils may have a higher potential impact because of the additives and contaminants they contain.

Waste oils are more likely to be contaminated with polychlorinated biphenyls (PCBs) than other dust suppressants. Therefore, as a minimum, municipal organizations and other agencies that use waste oils for road dust suppression have a responsibility to sample the waste oil to ensure that they are in compliance with the federal government's Chlorobiphenyls Interim Order. This order specifies a maximum concentration of five parts per million by weight of chlorobiphenyls of the liquid that is applied to a road surface.

The concern that waste oil may contain PCBs led Environment Canada to contract I.D. Systems Ltd. to carry out a road dust suppression survey in Manitoba.

2.0 METHODOLOGY

A questionnaire (Appendix 1) was prepared and mailed to every R.M. Secretary/Treasurer or town, village or city manager listed in the "1989 Municipal Officials" guide, along with a stamped, return envelope. These administrators were contacted because they process all bills and payments made by their organization and would therefore know the products and volumes purchased for road dust abatement and the names of the product suppliers. A response was requested within two weeks.

Upon return, questionnaires were sorted according to dust abatement products used. Respondents who indicated any type of oil use were then telephoned to confirm their response.

Administrators who did not return the questionnaire were interviewed by telephone. Telephone interviews were also held with the Department of Highways and Transportation and the provincial Parks Branch to determine their road dust abatement programs.

In addition, all commercial suppliers named in agency questionnaire responses were interviewed by telephone to determine the nature of the products sold for road dust abatement, to confirm some of the reported quantities used by agencies, or to ascertain amounts used in cases where this was not reported by the agency.

3.0 RESULTS AND DISCUSSION

Responses were obtained from all 203 agencies contacted. The response to the questionnaire was excellent, nearly 82% were returned within a two week period.

A summary of the type of dust abatement materials used by each government agency is presented in Appendix 2. The responses are grouped into six categories of non-treatment and treatment practices and the agencies are listed in alphabetical order. Since some R.M.s, towns and villages, etc. use more than one chemical for dust abatement, the total number of records exceeds 203, for a total of 245.

A summary of products used for dust abatement in Manitoba is presented in Table 1. Waste oils are also used in addition to other abatement products.

TABLE 1 SUMMARY OF DUST ABATEMENT IN MANITOBA

Total	Out of	Treatment Used	Percent
42	203	No Dust Abatement	21%
105	203	Calcium Chloride	51%
62	203	Calcium Lignosulphonate	31%
10	203	Asphalt Oil	5%
18	203	Used Oil	9%
8	203	Crude Oil	3%

* Due to the fact that some of the organizations use more than one type of treatment on their roads, the total will not add up to 100%.

The results show that of the 203 agencies contacted, only 36 use oil of any type for dust abatement. Ten of these agencies purchase commercial asphalt oil, eight use crude oil and 18 use waste oil collected primarily from local garages.

In carrying out this survey, it was found that many agencies did not know exactly how many kilometres of road were treated because they contracted commercial applicators to only apply suppressants on roads fronting residences. In some cases they reported total road distance travelled which was much longer than the sum of the road distance sprayed.

In attempting to analyze application rates there were some very high and low application rates. These may have been a function of unknown frequency of applications, varying road widths and sizes of spray bars, and spraying in front of residences only but reporting total distance travelled.

In spite of this, there were sufficient data to determine approximate average application rates for all but calcium chloride as volumes and distances were not asked for in the questionnaire. In the calculation of application rates shown in Table 2, extremes were eliminated.

TABLE 2 VOLUMES, DISTANCES AND AVERAGE APPLICATION RATES BY PRODUCT

Product	Sample Size	Volume (Litres)	Distance * (km)	Average Application Rate (L/km)
Lignosulphonate	8	191,257	42.5	4,500
Asphalt Oil	3	150,000	54	2,800
Crude Oil	3	252,938	55	4,600
Used Oil	12	705,912	260	2,700

* Where distances sprayed and application frequencies were given as ranges, they were averaged.

The application rates presented in Table 2 are presented as information only, since there is insufficient information to determine actual provincial use. The total volume of used oil applied by 15 of 18 agencies which apply used oil was approximately 851,000 L in 1989. This amount varies from year to year.

The names of the dust suppressant distributors were requested as part of the survey. Almost all distributors were contacted to determine the type and origin of the products each distributor sold for dust abatement. The names and addresses of each distributor and the types of materials sold are summarized in Table 3.

Most of the dust abatement products used are generally considered to have an acceptable environmental impact (e.g., calcium chloride, calcium lignosulphonate - Envirobind and M & F Road Stabilizer, crude oil and asphalt oil). In the case of used oils, however, there are some concerns regarding the composition of some of the oils supplied.

A large percentage of the used oil is collected by septic haulers who in turn sell it to agencies for dust abatement. Some agencies such as the R.M. of St. Andrews and the Town of Dauphin collect used oil from service stations and store it for their own use.

Although service stations appear to be the main supply source for septic haulers, they have reported other sources of oil such as diesel locomotive crankcase oil and oil from military vehicles. There is a good possibility that there are other unmentioned sources of used oil sold by the septic haulers.

TABLE 3 - LIST OF DISTRIBUTORS AND PRODUCTS CARRIED

<u>COMPANY NAME</u>	<u>ADDRESS</u>	<u>PHONE #</u>	<u>PRODUCT</u>
Arthur's Distributing	Box 19, Grp. 13c, RR1C, Winnipeg, MB		Used Oil
Brandon Septic Service	Box 373 2025 Braecrest Brandon, MB	728-7278	Used Oil
Clark's Septic Service	315 Park Ave. E. Brandon, MB	728-9010	Used Oil
Consolidated Oil	415 Dawson Road Winnipeg, MB	237-3310	Used Oil
Environmental Dust Control	1500 Chevrier Blvd. Winnipeg, MB	477-0980	Envirobind (Calcium Lignosulphon -ate)
Forsyth Hauling	Box 21 Pierson, MB	634-2493	Crude Oil
Hayward's Trucking	9825th Av S Virden, MB	748-1078	Crude Oil
Henderson Oils	415 Dawson Road Winnipeg, MB	233-7962	Used Oil
Koch Materials Company	385 Softley Winnipeg, MB	233-1424	Asphalt Oil
Mackenzie and Fiemann Ltd.	311-255 West 1st St. (604) North Vancouver B.C., V7M 3G8	980-7055	M & F Road Stabilizer (Lignosulph- onate)
Morris Hauling and Acidizing	Box 145 Virden, MB	748-1958	Crude Oil
Papineau Motors	Lot 1 Powerview, MB	367-2684	Used Oil
Prime Motor Oils	415 Dawson Road Winnipeg, MB	783-7197	Used Oil
Stan's Septic Service	Box 999 Arborg, MB	376-5562	Used Oil
Zenith Paving Ltd.	Box 786 Brandon, MB	728-3388	Asphalt Oil

4.0 CONCLUSION

Dust control will continue to be demanded by residents living adjacent to gravel roads. Municipalities, towns, parks branches, and other government organizations will satisfy this demand by choosing one of a variety of dust control materials. The choice of dust suppression materials will continue to be dependent on a number of factors, including effectiveness, cost, regulatory requirements, and concerns expressed by the public.

Waste oil will continue to be used in Manitoba in the future because of its availability, low cost, and effectiveness. Most of the used oil comes from crankcases (automobile, locomotive, aircraft), therefore, accidental contamination of this oil with PCBs is unlikely. Since storage of PCB liquids is costly, however, there is significant incentive for unscrupulous individuals to add PCB contaminated oil to the used oil anywhere between the time of generation and the time of application on road surfaces. For this reason, it would appear important to implement a random sampling program as well as to ensure that all dust control applicators are aware of their responsibilities under the Chlorobiphenyls Interim Order of the Canadian Environmental Protection Act.

APPENDIX 1

SAMPLE QUESTIONNAIRE

I.D. SYSTEMS LTD.
Environmental and Socio-Economic Consultants

905 Waverley Street
Winnipeg, Manitoba R3T 5P4
(204) 489-0333 Telex: 07-587870 Fax: (204) 453-9012



Dear Sir/Madam:

The Environmental Protection Directorate of Environment Canada has contracted I.D. Systems Ltd. of Winnipeg to carry out a survey of dust abatement programs carried out in Rural Municipalities, Local Government Districts, towns and villages as well as other agencies with abatement programs.

Their primary interest is to determine the types, amounts and origins of oils used in Manitoba for dust abatement.

We have developed a short questionnaire and would appreciate it if you or your designate would take the time to fill it out and return it to us in the next two weeks.

Ms. Leslie Tymm of our staff will follow up this questionnaire with a phone call but if you have any questions in the meantime please don't hesitate to call me (489-0333). We appreciate your cooperation.

Yours truly,

I.D. SYSTEMS LTD.

A handwritten signature in black ink, appearing to read 'W.K. Harper', is written over a horizontal line.

W.K. Harper
General Manager

DUST ABATEMENT QUESTIONNAIRE

(PLEASE PRINT)

1) NAME OF R.M., LGD, TOWN OR VILLAGE _____

2) YOUR NAME _____ POSITION _____

3) DO YOU CARRY OUT DUST ABATEMENT? (CIRCLE) YES - NO

IF "NO", PLEASE RETURN QUESTIONNAIRE

IF "YES", PLEASE CONTINUE

4) WHAT DO YOU USE FOR DUST ABATEMENT (CHECK EACH ONE AS APPLICABLE)

CALCIUM CHLORIDE _____

ASPHALT OIL _____

USED OIL _____

OTHER (PLEASE DESCRIBE) _____

IF YOU USE CALCIUM CHLORIDE ONLY, PLEASE RETURN THE QUESTIONNAIRE.

IF YOU USE OILS, PLEASE CONTINUE

5) FROM WHOM DO YOU OBTAIN OR PURCHASE COMMERCIAL DUST ABATEMENT OIL?

NAME	ADDRESS	TYPE OF OIL PURCHASED	VOLUME
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

6) FROM WHOM DO YOU PURCHASE USED OIL?

NAME	ADDRESS	TYPE OF OIL PURCHASED	VOLUME
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

- 7) HOW MUCH USED OIL DO YOU PURCHASE OR OBTAIN FROM SERVICE STATIONS? _____ Litres
- 8) HOW MANY KILOMETRES OF ROAD DO YOU OIL TREAT PER TREATMENT? _____ km
- 9) HOW MANY TIMES DO YOU OIL TREAT ROADS EACH YEAR? _____
- 10) IN WHAT MONTHS DO YOU OIL TREAT ROADS? (CIRCLE) A M J J A S O
- 11) DOES YOUR ORGANIZATION APPLY THE OILS? (CIRCLE) YES - NO
- 12) IF APPLIED BY A CONTRACTOR:

NAME _____

ADDRESS _____

PLEASE RETURN TO:

Attention: W.K. Harper

I.D. SYSTEMS LTD.
905 Waverley Street
Winnipeg, Manitoba
R3T 5P4

Telephone: 489-0333

APPENDIX 2

SUMMARY OF TYPE OF DUST ABATEMENT TREATMENTS USED BY ALL AGENCIES

APPENDIX 2: SUMMARY OF DUST ABATEMENT TREATMENT TYPES USED BY ALL AGENCIES.

ORGANIZATION	LEVEL	T R E A T M E N T				
		NONE	USED	CRUDE ASPH.	CACL ₂	LIGNO
ALBERT	R.M.	Y				
ALEXANDER	L.G.D.			Y		
ALONSA	L.G.D.				Y	
ALTONA	TOWN				Y	
ARBORG	VILLAGE		Y			
ARCHIE	R.M.	Y				
ARGYLE	R.M.				Y	
ARMSTRONG	L.G.D.					Y
ARTHUR	R.M.					Y
BRAUSEJOUR	TOWN				Y	
BENITO	VILLAGE					Y
BIFROST	R.M.		Y		Y	
BINSCARTH	VILLAGE					Y
BIRTLE	R.M.			Y		
BIRTLE	TOWN				Y	
BLANSHARD	R.M.					Y
BOISSEVAIN	TOWN				Y	
BOULTON	R.M.	Y				
BOWSMAN	VILLAGE				Y	
BRANDON	CITY				Y	
BRENDA	R.M.					Y
BROKENHEAD	R.M.			Y		
CAMKRON	R.M.				Y	
CARBERRY	TOWN				Y	
CARMAN	TOWN				Y	
CARTIER	R.M.					Y
CARTWRIGHT	VILLAGE	Y				
CHURCHILL	L.G.D.	Y				
CLANWILLIAM	R.M.				Y	
COLDWELL	R.M.					Y
CONSOL	L.G.D.				Y	
CORNWALLIS	R.M.		Y	Y		
CRYSTAL CITY	VILLAGE				Y	
DALY	R.M.	Y				
DAUPHIN	R.M.					Y
DAUPHIN	TOWN		Y		Y	
DE SALABERRY	R.M.				Y	
DELORAINE	TOWN	Y				
DUFFERIN	R.M.				Y	
DUNNOTTAR	VILLAGE					Y
EAST ST. PAUL	R.M.					Y
EDWARD	R.M.			Y		
ELKHORN	VILLAGE				Y	Y
ELLICE	R.M.			Y		
ELTON	R.M.				Y	Y
EMERSON	TOWN				Y	
ERICKSON	VILLAGE				Y	

APPENDIX 2: SUMMARY OF DUST ABATEMENT TREATMENT TYPES USED BY ALL AGENCIES.

ORGANIZATION	LEVEL	T R E A T M E N T				
		NONE	USED	CRUDE ASPH.	CACL2	LIGNO
ERIKSDALE	R.M.	Y				
ETHRILBERT	R.M.	Y				
ETHRILBERT	VILLAGE				Y	
FISHER	L. G. D.				Y	Y
FLIN FLON	CITY				Y	Y
FRANKLIN	R.M.	Y				
GARSON	VILLAGE				Y	
GILBERT PLAINS	R.M.				Y	
GILBERT PLAINS	VILLAGE					Y
GILLAM	L. G. D.	Y				
GIMLI	R.M.			Y	Y	Y
GIMLI	TOWN				Y	
GLADSTONE	TOWN				Y	
GLENBORO	VILLAGE				Y	
GLENKILA	R.M.				Y	
GLENWOOD	R.M.	Y				
GRAHAMDALE	L. G. D.					Y
GRAND RAPIDS	L. G. D.				Y	
GRANDVIEW	R.M.	Y				
GRANDVIEW	TOWN					Y
GREY	VILLAGE				Y	
GREY	R.M.				Y	
HAMIOTA	R.M.	Y				
HAMIOTA	VILLAGE					Y
HANOVER	R.M.		Y	Y	Y	Y
HARRISON	R.M.		Y		Y	
HARTNEY	TOWN	Y				
HIGHWAYS & TRANSPORTATION	DEPARTMENT				Y	Y
HILLSBURG	R.M.	Y				
KILLARNEY	TOWN	Y				
LA BROQUERIE	R.M.	Y				
LAC DU BONNET	R.M.					Y
LAC DU BONNET	VILLAGE					Y
LAKEVIEW	R.M.				Y	
LANGFORD	R.M.	Y				
LANSLOWNE	R.M.				Y	
LAWRENCE	R.M.				Y	Y
LEAF RAPIDS	TOWN	Y				
LORNE	R.M.				Y	
LOUISE	R.M.	Y				
LYNN LAKE	L. G. D.	Y				
MACDONALD	R.M.				Y	
MACGREGOR	VILLAGE					Y
MANITOU	VILLAGE	Y				
MCCREARY	R.M.				Y	
MCCREARY	VILLAGE				Y	
MELITA	TOWN				Y	
MINIOTA	R.M.	Y				

APPENDIX 2: SUMMARY OF DUST ABATEMENT TREATMENT TYPES USED BY ALL AGENCIES.

ORGANIZATION	LEVEL	T R E A T M E N T				
		NONE	USED	CRUDE ASPH.	CACL2	LIGNO
MINITONAS	R.M.				Y	Y
MINITONAS	VILLAGE		Y			
MINNECOSA	TOWN		Y		Y	
MINTO	R.M.					Y
MONTCALM	R.M.				Y	Y
MORDEN	TOWN				Y	
MORRIS	R.M.				Y	
MORRIS	TOWN					Y
MORTON	R.M.				Y	
MOSSEY RIVER	R.M.					Y
MOUNTAIN	L. G. D.	Y				
MYSTERY LAKE	L. G. D.	Y				
NEEPAWA	TOWN				Y	
NIVERVILLE	VILLAGE				Y	
NORTH CYPRESS	R.M.				Y	
NORTH NORFOLK	R.M.					Y
NOTRE DAME DE LOURDES	VILLAGE				Y	
OAK LAKE	TOWN				Y	
OAKLAND	R.M.	Y				
OCHRE RIVER	R.M.					Y
ODANAH	R.M.	Y				
PARK	L. G. D.				Y	Y
PARKS BRANCH	D. N. R.					Y
PEMBINA	R.M.				Y	
PILOT MOUND	VILLAGE				Y	
PINAWA	L. G. D.				Y	
PINEY	L. G. D.	Y				
PIPESTONE	R.M.					Y
PLUM COULEE	VILLAGE				Y	
PORTAGE LA PRAIRIE	CITY				Y	
PORTAGE LA PRAIRIE	R.M.				Y	Y
POWerview	VILLAGE		Y	Y		
RAPID CITY	TOWN				Y	
REYNOLDS	L. G. D.				Y	
RHINELAND	R.M.					Y
RITCHOT	R.M.				Y	Y
RIVERS	TOWN	Y				
RIVERSIDE	R.M.				Y	
RIVERTON	VILLAGE		Y		Y	
ROBLIN	R.M.	Y				
ROBLIN	TOWN					Y
ROCKWOOD	R.M.				Y	Y
ROLAND	R.M.				Y	
ROSKDALE	R.M.					Y
ROSSEBURN	R.M.					Y
ROSSEBURN	VILLAGE	Y				
ROSSER	R.M.					Y
RUSSEL	R.M.				Y	

APPENDIX 2: SUMMARY OF DUST ABATEMENT TREATMENT TYPES USED BY ALL AGENCIES.

ORGANIZATION	LEVEL	T R E A T M E N T				
		NONE	USED	CRUDE ASPH.	CACL2	LIGNO
RUSSEL	TOWN					Y
SASKATCHEWAN	R.M.				Y	
SELKIRK	TOWN		Y			Y
SHILL RIVER	R.M.	Y				
SHILLMOUTH	R.M.	Y				
SHOAL LAKE	R.M.					Y
SHOAL LAKE	VILLAGE	Y				
SIFTON	R.M.	Y				
SIGLINES	R.M.					Y
SILVER CREEK	R.M.	Y				
SNOW LAKE	TOWN				Y	
SOMERSET	VILLAGE				Y	
SOURIS	TOWN	Y				
SOUTH CYPRESS	R.M.	Y				
SOUTH NORFOLK	R.M.				Y	
SPRINGFIELD	R.M.				Y	
ST. ANDREWS	R.M.		Y			
ST. CLAUDE	VILLAGE				Y	
ST. CLEMENTS	R.M.		Y		Y	Y
ST. FRANCOIS XAVIER	R.M.					Y
ST. LAURENT	R.M.				Y	Y
ST. LAZARE	VILLAGE			Y		
ST. PIERRE JOLYS	VILLAGE				Y	
STANLEY	R.M.				Y	
STR. ANNE	R.M.		Y		Y	
STR. ANNE	VILLAGE		Y		Y	
STR. ROSE	R.M.					Y
STR. ROSE DU LAC	VILLAGE					Y
STRINBACH	TOWN		Y	Y	Y	
STONEWALL	TOWN				Y	
STRATHCLAIR	R.M.				Y	
STRATHCONA	R.M.					Y
STUARTBURN	L. G. D.	Y				
SWAN RIVER	R.M.				Y	
SWAN RIVER	TOWN			Y	Y	
TACHE	R.M.				Y	Y
TEULON	VILLAGE					Y
THE PAS	TOWN				Y	
THOMPSON	CITY			Y		
THOMPSON	R.M.				Y	
TREHERNE	VILLAGE				Y	
TURTLE MOUNTAIN	R.M.				Y	
VICTORIA	R.M.					Y
VICTORIA BEACH	R.M.		Y			
VIRDEN	TOWN			Y	Y	
WALLACE	R.M.			Y	Y	
WASKADA	VILLAGE				Y	
WAWANESA	VILLAGE	Y				

APPENDIX 2: SUMMARY OF DUST ABATEMENT TREATMENT TYPES USED BY ALL AGENCIES.

ORGANIZATION	LEVEL	T R E A T M E N T					
		NONE	USED	CRUDE	ASPH.	CACL2	LIGNO
WEST ST. PAUL	R.M.		Y		Y	Y	
WESTBOURNE	R.M.					Y	
WHITEHEAD	R.M.	Y					
WHITEMOUTH	R.M.					Y	Y
WHITEWATER	R.M.					Y	
WINCHESTER	R.M.						Y
WINKLER	TOWN					Y	Y
WINNIPEG BEACH	TOWN				Y		
WINNIPEG, DISTRICTS 1-6	CITY				Y	Y	Y
WINNIPEGOSIS	VILLAGE					Y	
WOODLANDS	R.M.						Y
WOODWORTH	R.M.					Y	